

Development of a risk calculator to predict spontaneous stone passage in patients with acute ureteric colic

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MIMIC Study Group

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Background: Renal colic is a significant problem

- Current guidelines only mention that asymptomatic ureteric stones up to 1 cm may be managed conservatively.
- 25% of all stones may not pass and re-present as an emergency requiring intervention
- Lack of evidence on predicting which patients may spontaneously pass their stone.









Methods

- We used the MIMIC Study 2016/17 dataset, which was a 4171-patient cohort study in 71 sites
- 2518 patients discharged with initial conservative management were included in the modelling process
- 1874 passed their stones spontaneously (74.4%)
- Mean age was 47 (±14.7) and 1892 were male (75.3%)





Methods

- The following variables and their influence on spontaneous stone passage are assessed
 - Gender
 - Neutrophil count
 - Hydronephrosis
- Hydroureter
- Perinephric stranding
- Temperature
- Stone size and position
- Logistic regression was used to obtain the set of variables with the highest predictive ability for spontaneous stone passage
- The corrected β -coefficients after internal validation was used to create a nomogram





Pointe	0.0	0.5	1.0	1.5		2.0	2.5	3.0	3.5	4.0	4.5
T OILLS	-										
Gender	Male										
Neutrophils	0 4	8 12	16 20								
Hydronephrosis	Yes										
Hydroureter	No		_								
Temperature	No		5								
Size	Γ		>5	-7mm							
	>7mm 0-5mr Middle Ureter									0-5mm	
Position	Upper Ureter Lower Ureter/Vesicoureteric Junction (VUJ)										
Total Points											
	0	1	2	3	4	5	6	7	8	9	10
SSP probability		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		0.95

Results

Nomogram can determine a probability of spontaneous stone passage ranging from 20% to 95%





Results

Internally validated in a subset of patients from 2009-2015 (n=1728)

C-statistic of the corrected model was 0.77 indicating good discrimination

Externally validated in a subset of patients from 2016 and 2017 (n=789)

Confirming that the model was insensitive to temporal trends



British Urology Researchers in Surgical Training



Calculator Interface





Conclusion

• Our risk calculator has significant potential in guiding clinical management of patients with ureteric stones

 It allows better selection of patients suitable for conservative treatment and can be used in the counselling of patients for either conservative management or intervention.



